UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
901 NORTH 5th STREET
KANSAS CITY, KANSAS 66101

November 29, 2007

MEMORANDUM

SUBJECT: Modeling Review – Doe Run, Herculaneum, Missouri

FROM: Richard L. Daye
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AWMD/APDB

TO: Bruce Morrison
Super Fund

I have completed my review of Appendix A to the *Community Risk Assessment, Herculaneum, Missouri,* December 14, 2006, report that was prepared by the Gradient Corporation (Gradient) for the Doe Run Resources Corporation (Doe Run).

Gradient used EPA's Industrial Source Complex, Short-Term (ISCST) model to model emissions from the slag pile at the Doe Run lead facility located in Herculaneum, Missouri. The ISCST model was replaced in November 2005 by EPA's AERMOD air dispersion model. The AERMOD system includes the preprocessing AERMAP and AERMET models. The AERMOD model has better scientific algorithms and should give more accurate predictions. It should have been used. Both of these air dispersion models can account for emissions that are dependant on wind speed. One year (1990) of meteorological data from the St Louis International Airport was used in the analysis. The meteorological data from the St Louis International airport are not representative of the meteorological conditions near the Doe Run Herculaneum lead facility. Meteorological data (April 1997-March 1997) measured at the Doe Run facility were used for the modeling for the 2000 State Implementation Plan (SIP) and the forthcoming 2007/8 SIP. These data are available and should have been used because of the local effects caused by the topography in the Herculaneum area. The SIP analyses show that the concentrations/deposition values decrease rapidly as the distance from the sources increase. I did not see any information on the location or density of the model receptors. No electronic files were included so it is not possible to see, or verify, what was actually modeled.

As noted in the report, only the slag pile was modeled. The modeling that has been done for the lead SIPs for the facility indicates that other lead sources at the facility have more impact on the surrounding area than does the slag pile. All the lead sources, including all the roadways, at and/or, leading to, or from, the facility must be modeled to determine the total impact of the emissions associated with the facility.

The calculated threshold wind speed (U_t) reported on pages A-2 and A-3 of Gradient's report is 3.0 m/s. This value is much lower than what has been used in the modeling for the lead SIPs. The calculated thresholds wind speeds for the lead SIPs were about 11 to 19 m/s. The calculation to determine the threshold wind speed is very sensitive to the selection of the threshold friction velocity (U_0) and the surface roughness height (Z_0). The value of U_0 that Gradient used was 0.25 m/s (page A-2). I have not been able to verify that this is a default value referenced in *U.S. Environmental Protection Agency (USEPA). 1996. Office of solid Waste and Emergency Response. Soil Screening Guidance: Technical Background Document. NTIS. PB96-963502; EPA-540/R-95/128; OSWER Publication 9355.4-17A.May.* The EPA document references a "corrective" threshold friction velocity of 0.625 m/s. This translates into a threshold wind speed of about 11.3 m/s when used in Equation 2 on page A-2 of the Gradient report, $U_t = U_0/0.4 \ln(Z/Z_0)$. It is not possible to evaluate the lead predictions because I do not have the model's input or output files. However, predicted impacts are higher when a low threshold wind speed has been used in the model.

SUMMARY: The AERMOD model using meteorological data measured at the Doe Run facility should have been used. The threshold wind speed should be recalculated before the model is re-run. All the lead sources should be included in the modeling in order to obtain the total impact from emissions associated with the Doe Run facility.

(via email)